

# The NIST Assessment of U.S. Measurement System and Your Workshop

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- The nation's measurement system (the USMS) is the complex of all the people and institutions, private and public, that make, use, or serve to insure the validity of measurements
- Measurements are carried out across the entire spectrum of the economic activity, from business, trade, and commerce, through medicine and health care, to government and defense
- Everyone in the U.S. depends upon measurements every day
- No single institution and no individual has responsibility for or authority over the system that produces those measurements

- NIST is the U.S.'s National Measurement Institute and is responsible for the U.S. national standards of physical measurement
- In that capacity it has accepted the challenge to take a look to see whether the U.S.'s measurement system is meeting the nation's measurement needs
- The purpose of this presentation is to describe for you
  - how NIST is going about this assessment
  - how the assessment fits with your workshop and
  - how it can help address the needs that you identify

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## NIST and Its Assessment of the USMS

- NIST is the U.S.'s National Measurement Institute, responsible for realizing and providing access to the U.S. national standards of physical measurement, the units of the International System of Units, the SI
- Many people think that NIST, as such, should take a look to see whether the U.S.'s measurement system (USMS) is adequately meeting the nation's measurement needs
- NIST has been persuaded to make such an assessment
- To do so, the NIST Director has
  - created the NIST USMS Project
  - designated a Director reporting to him
  - established an objective for NIST to produce an assessment by June 2006

## Logic of the NIST Look at the USMS

Technological innovation is a major source of the nation's economic well-being and military strength

Technological innovation is the introduction into the marketplace of new technology

Most of U.S. industry's most critical needs in measurements are linked to technological innovation

It is a primary function of the U.S. measurement system to deliver measurements that meet U.S. industry's measurement needs

An assessment of the state of the USMS can well be based then on a survey of industry measurement needs relative to technological innovation

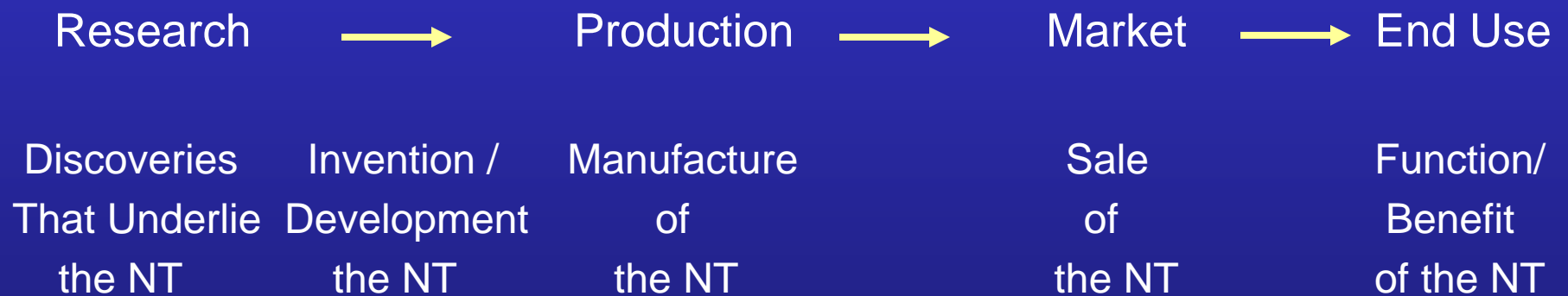
From the assessment, an action plan can be developed to address the industry needs and systemic problems identified

## **View of Measurement Problems as Technical Barriers within Overall Process of of Technological Innovation**

Technological Innovation = Introduction into Marketplace of New Technology

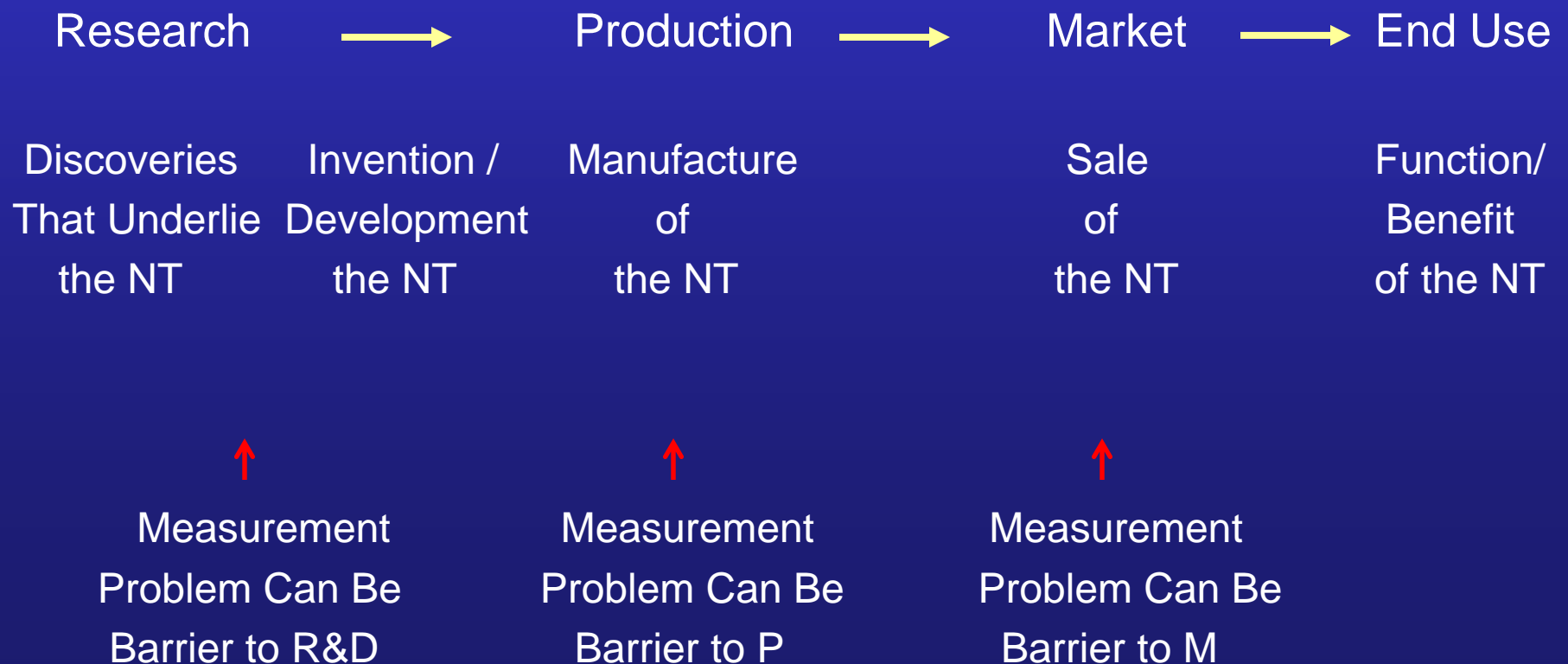
## View of Measurement Problems as Technical Barriers within Overall Process of Technological Innovation

Technological Innovation = Introduction into Marketplace of New Technology  
Moved from Research through Production and Market to End Use



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## Examples of Measurement-Problem Barriers to Technological Innovation

### Barrier at Marketing

A U.S. instrumentation company develops a digital multi-meter with linearity and precision that it believes, but cannot prove to customers, are far beyond anything else commercially available

### Barrier at Mfg

U.S. producers of integrated-circuit photomasks cannot reproducibly establish the widths of the new-generation features on the masks they are making because of mysterious discrepancies in measured widths

### Barrier at R&D

U.S. developers of carbon-nanotube based materials are stymied in getting predictable results by inability to define the composition of the nanotube additive in terms of purity, count and distribution of lengths of nanotubes

## Surveying the Space of Industry Measurement Needs

To achieve a broad survey of industry measurement needs,  
the approach is to look at the overall space of measurement needs  
from different perspectives, that is, from different bases,  
at the same time in parallel

## The Bases for the Survey of the Space of Measurement Needs

Sectors	Semiconductor, Automotive, Software
Technologies	Broad (including Nanotechnology, Bio-/Medical Imaging, Disaster First-Responder) and Discrete (including Workshop Topics)
SI Units	Mass, Length, Time, Electrical Quantities, Temperature, Amount Substance, Luminous Intensity
Disciplines	Physics, chemistry, material science, electrical engineering, civil-mechanical engineering, manufacturing engineering, computer-IT sci-eng

## The Datum of Input to the USMS Assessment: An Industry “Measurement Need” (MN)

Information	Technological innovation at stake Economic significance of the innovation Technical barrier to the innovation Stage of innovation at which technical barrier appears Measurement-problem part of the technical barrier Potential solutions to the measurement problem Potential providers of these solutions Government role, if any, in these solutions
Format	One page, crafted, with documented support

## The Output of the NIST Look at the USMS

In June 2006 NIST will report to industry and other stakeholders the results of its assessment of the USMS

The NIST USMS assessment report will include

- the specific innovation-limiting industry measurement needs that it has identified
- its findings on the state of the USMS, on measurement needs and on systemic problems
- the follow-up actions it will take to facilitate achievement of solutions to those needs and problems

## The Intended Benefits of the NIST Assessment and Its Report

- Allow potential providers of solutions to specific measurement problems to be engaged and mobilized
- Bring the attention of stakeholders to bear on systemic issues in the functioning of the U.S. measurement system as whole
- Serve as a catalyst for the identification of other industry needs and systemic problems of the USMS
- Overall contribute to getting the nation's innovation-limiting measurement needs addressed

## Where Your Workshop Fits in This NIST USMS Effort

- Your workshop is a key player in the identification of measurement needs that are economically important to the U.S.
- It may identify specific measurement problems that pose technical barriers to vital technological innovations
- If so, those problems can be cast as “Measurement Needs” that go into the USMS report that NIST will produce
- And NIST USMS effort will act on every Measurement Need identified, working with industry to pursue solutions

## Sum-Up and Conclusion

- A key part of the nation's infrastructure is its measurement system, what we're calling the USMS
- NIST has accepted the challenge of looking at that system to see how it is meeting the nation's measurement needs in the area of technological innovation
- Your workshop provides invaluable input to that assessment and a basis for action for pursuing solutions to the measurement problems identified
- I appreciate your participation and wish you well in your work
- If you have questions, your NIST coordinator in this workshop can take them now